

Sinusoidal Application Problems 0809

①

X	303	311	319	326	333	341
Y	0.5	1.0	0.5	0	0.5	1.0

② $y = 0.5 \cos \left[\frac{\pi}{15} (x - 311) \right] + 0.5$

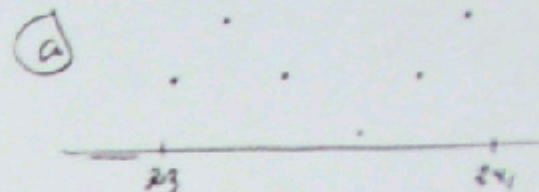
↓
deviation
from
avg.
illumination

↓
period
completes
about $\frac{1}{2}$
of a cycle

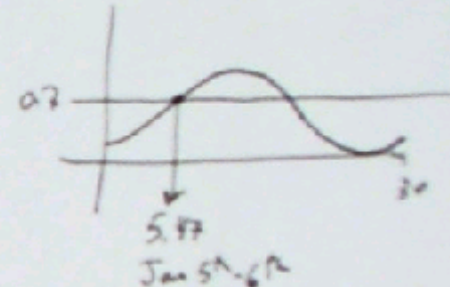
Nov.
7th

↓
avg.
illumination

in 6.28 days

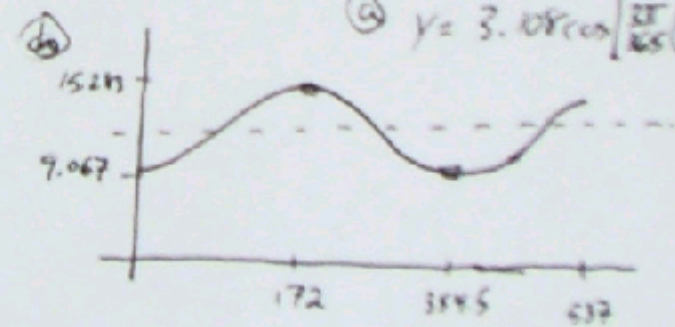


④



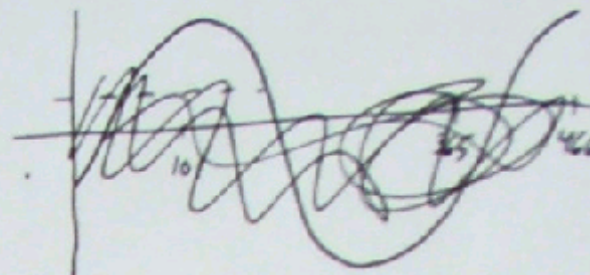
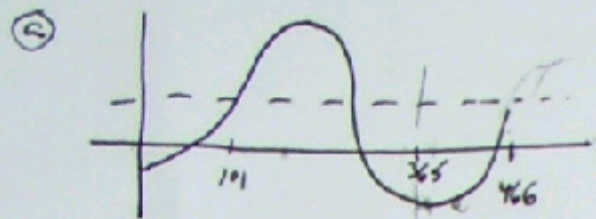
② day 172 → 15.283 hrs.
day 355 → 9.067 hrs.

③ $y = 3.108 \cos \left[\frac{2\pi}{365} (x - 172) \right] + 12.175$
 $y = 12.721$ hrs on April 1st



⑤ $y = 3.108 \cos \left[\frac{2\pi}{365} (x - 172) \right] + 12.175$

$$\textcircled{3} \quad T = 36 \sin \frac{2\pi}{365} (t - 101) + 14$$



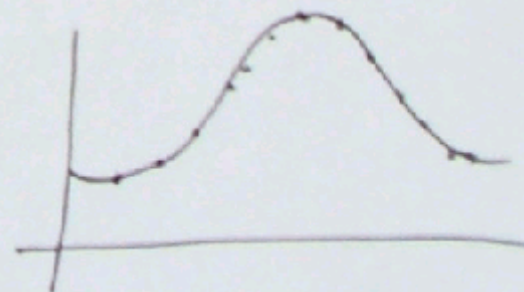
⑥ Coldest day $\rightarrow P = 365$

coldest day is $\frac{3}{4}$ way through

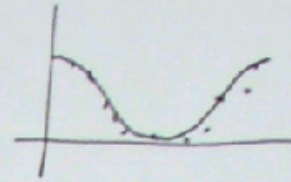
$$\text{So } \frac{3}{4} \cdot 365 + \frac{365}{101} = 374.75$$

or about
Jan 9-10

$$\textcircled{4} \quad y = 21.9 \cos \left[\frac{2\pi}{6} (x - 7) \right] + 51.6$$



⑤ $y = 2.95 \cos \left[\frac{\pi}{6}(x-1) \right] + 3.15$



⑥ again high (4, 16) low (9, -2) $\text{Diam} = 18$ $P = 10$ π



⑦ $y = 9 \cos \left[\frac{\pi}{5}(x-4) \right] + 7$

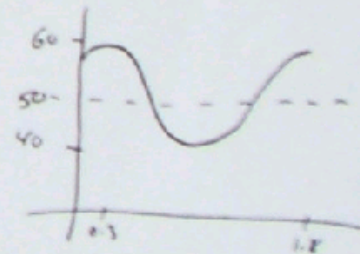
⑧ $f(5) = 14.28$ $f(17) = 4.22$

⑨ $f(0.05) \approx 0$ coming out of water \rightarrow values from 0 to 6 sec.

⑩ again high (0.3, 60) low (1.8, 40) ⑪ $y = 10 \cos \left[\frac{2\pi}{3}(x-0.3) \right] + 50$

⑫ $y = 10 \cos \left[\frac{2\pi}{3}(17.2-0.3) \right] + 50 = 43.3$

⑬ $f(0) = 58.1$ ⑭ $f(0.085) = 59$



⑮ again high (5, 17) low (2, -2) Period = 6 sec ⑯ $y = 20 \cos \left[\frac{\pi}{3}(x-5) \right] + -3$

⑰ $f(2.8) = -16.38$ $f(6.3) = 1.16$ $f(15) = -13$

⑱ $f(0) = 7$ ⑲ $f(0.5) = -3$

The answers to the graphs on the last page are in the back of your textbook, p. A-9, under "Summary Exercises for graphing"